

# Adapting Your Home for More Accessible Living

A feeling of independence is important to everyone. The ability to function well in your home helps you maintain comfortable independence. People with physical disabilities caused by injury, illness or aging often find it necessary to adapt their homes to make daily tasks easier and safer. There is much that can be done with little effort or cost.

The first step might be having the home assessed by professionals such as occupational or physical therapists, case managers, building inspectors associated with neighborhood rehabilitation programs, and municipal energy specialists. They can suggest ways to make the home environment safer and more convenient for people with loss of strength, flexibility, dexterity, sight or hearing.

## Vision Loss

Visual impairments and blindness are not always the severe handicaps they are often imagined to be. There are many kinds of vision problems. Some people may find it hard to pick out details in their environment. They can see only large items or distinguish only shadow and light. Some people cannot see well when

there is too much light, such as glare from highly polished floors and reflective wall coverings, or bright light from direct lighting or windows. Other people may not be able to see well in low light. Or, their eyes might not respond quickly to abrupt changes in lighting, as when going from a well-lighted area to a dark one. Depth perception may also be a problem, making it difficult to see steps, judge the height or depth of stair treads, or see where one wall meets another or where a wall meets the floor.

Poor vision makes it hard to read clocks, telephone dials, touch pads, appliance controls, thermostats, and printed material in general (recipes, labels on food and household products, newspapers, books, telephone directories, and prescription medicine labeling). This disability threatens one's safety and ability to live independently.

## Modifications for Vision Loss

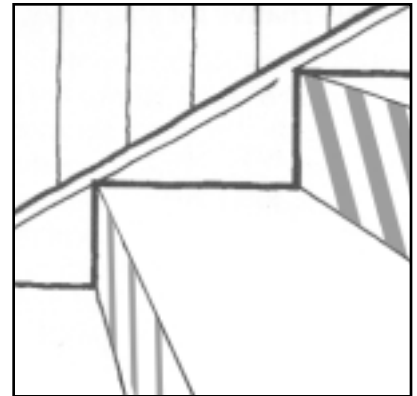
If more or better lighting is needed, try installing task lighting in selected spaces such as the kitchen, in reading areas, in the bathroom, and on the stairs. There are stick-on or screw-in fluorescent lights that fit under kitchen cabinets and along stairwells and hallways; plug-in wall sconces or lamps; and plug-in ceiling swag lights. Light switches that glow in the dark are also available, as are rheostats to adjust the intensity of lighting (for more or less brightness, as needed). A skylight can illuminate even the darkest room. Less costly than a skylight but giving the effect of one is a new technology called the light tube. This device is installed through a roof.

If bright light or glare causes a problem, use blinds or shades, coating on windows, nonglare or low-gloss finishes on floors, and textured wallpaper or matte paint on walls.

It is also helpful to the person with low vision if visual cues are replaced with other sensory cues. For example, different floor surfaces (tile in the entrance foyer, carpeting

in the living room, hardwood in the hall, vinyl in the kitchen, etc.) give tactile cues for navigation. Attaching sticky-backed felt to the smooth surface of a microwave oven's pressure pad can help one find the frequently used controls such as Reheat, 1 minute, Start and Clear. A talking microwave is another option.

Some people with low vision are helped by using bright, contrasting colors to differentiate walls, floors and counters. Colors or contrasting patterns might be used



to distinguish the risers on stairs (the vertical parts) from the treads (the horizontal parts). Using white or reflecting tape to clearly mark changes in floor levels can prevent falls.

Visually impaired people can adapt successfully to most environments, especially the familiar spaces of their own homes.

## Hearing Loss

Hearing loss is a common disability, especially among older people. As people age, they often lose inner ear bone conductivity and/or nerve sensitivity. Some people have trouble hearing certain sounds, particularly soft ones. They might not be able to hear high tones, low tones, or both. When listening to speech, they might not be able to understand certain words containing higher-pitched consonants. When there is background noise or several conversations are going on at once, understanding speech is even more difficult. Some people may also have difficulty locating the source of sounds.

In the home, these problems can make it hard to hear doorbells, telephones, voices on the phone, televisions or radios. More

important, people with hearing problems might not be able to hear warnings from smoke and fire alarms.

## Modifications for Hearing Loss

One way to modify the home is to make auditory signals louder. Adding an amplifying device to a telephone or replacing an existing telephone with an amplified one can help. When amplification is not sufficient, auditory signals can be replaced with other sensory signals. A simple flashing light attached to a doorbell, telephone or timer, and a strobe light attached to the smoke alarm to distinguish it from the simple flashing light, are examples. Any emergency communication system should be equipped with either a visual or vibrating warning system.

A TDD (telecommunications device for the deaf) enables a person who is deaf to communicate over the telephone. The user types out a message on a teletypewriter and the message is picked up by a similar machine on the other end. Contact your telephone company for amplified handsets, signal devices, TDDs and extension bells. Ask for their special needs department.

A sound-activated device that shakes the bed and wakes a sleeping person can take the place of an alarm clock, and can also be attached to the fire alarm.

Another strategy is to try to decrease background noise. Installing insulating materials around noisy appliances such as dishwashers and washing machines, installing insulating materials on floors (e.g., soundproof subflooring covered with carpeting), and improving the home's acoustics to reduce sound transfer are ways of accomplishing this. Fabric window coverings also reduce noisiness and echoes.

## Touch and Hand Dexterity

Problems with the sense of touch may make it difficult for people to discriminate

between textures and shapes or hot and cold surfaces, or to sense changes in pressure. Their hands, arms or legs may feel numb, which can affect dexterity. Dexterity is the ability to execute fine finger movements—pinching, gripping, turning and twisting. It is closely related to touch. For people with arthritis or similar conditions, operating controls and switches, gripping objects such as door knobs, and using tools are major problems.

Problems with touch and dexterity can make it hard to adjust small controls on appliances or thermostats. Such problems may also limit a person's ability to grip, twist and turn doorknobs, faucet handles, and bottle and jar lids. Locking or unlocking doors and windows (gripping and turning the key or manipulating another type of lock) may be a challenge, as may plugging or unplugging electrical cords and opening packaged goods.

People who have lost some sense of touch may unknowingly sustain a burn from a stove, or a cut from a knife or other sharp implement. They may fall easily because of numbness in the feet. They also risk being scalded at the sink or in the tub or shower if they have set the temperature on the water heater incorrectly or if the flush of a toilet draws off cold water.

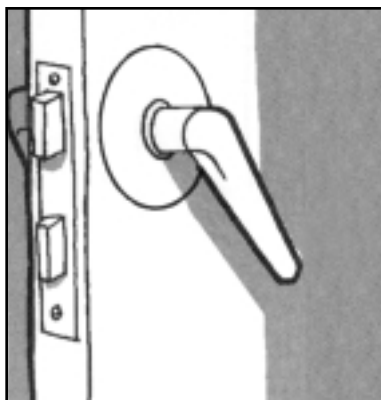
## Modifications for Touch and Dexterity

One way to modify the home is to heighten tactile sensation by making the surfaces of walls and counters more distinctive. Brick, vinyl and wood are useful for this purpose.

Another approach is to enhance safety, and there are many ways to do this. Lowering the temperature setting on the water heater lessens the danger of scalding. Installing temperature-limiting mixer valves on existing tubs and showers accomplishes the same purpose. Visual markers can be put on faucets to indicate preset or desired temperatures. Some new tubs and showers have

pressure-balance valves to compensate for the flush of a toilet or other sudden changes in water pressure. Other products that improve safety are covers for stove burners and guards for radiators. Some ranges have indicator lights that remain on to warn that a turned-off burner may still be too hot to touch. If dexterity is also an issue, there are touch-less faucets (activated or deactivated by heat sensors) with preset temperatures.

Lever controls and handles that do not require pinching or gripping movements can replace ones that do. These can be installed



on doors, cabinets, drawers and sinks. Light switches with rocker panels, touch pads, toggles, and push-button combination locks can also help. Some new appliances

have easy-to-grasp controls to make them easier to use.

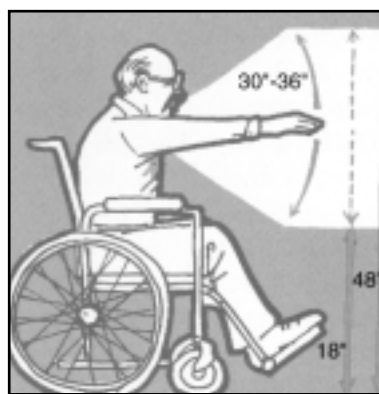
To determine whether or not a control can be used by a person with limited dexterity, try the following “rule of thumb”: If an able-bodied person can operate the control with his or her fist closed, then almost anyone, regardless of hand disability, will be able to operate the control.

## Loss of Strength and Range of Motion

Reduced strength in the arms and the legs may render people unable to sustain physical effort—for example, to stand for long periods or to carry heavy items even short distances. People who have diminished strength may also have difficulty lifting, pushing and pulling objects or raising or lowering themselves. Because of the design of most homes, important household tasks

such as cooking and washing dishes require one to stand for long periods. Other tasks require some upper-body strength, including making the beds, taking out the trash, and transporting items around the house (e.g., filling a pan with water, carrying it to the stove, carrying it back to the sink, draining the water from it, putting the cooked food in a bowl, and moving the bowl to the table). When strength is an issue, pushing or pulling doors and drawers is a challenge, as is moving heavy items down from high storage areas or up from low storage areas.

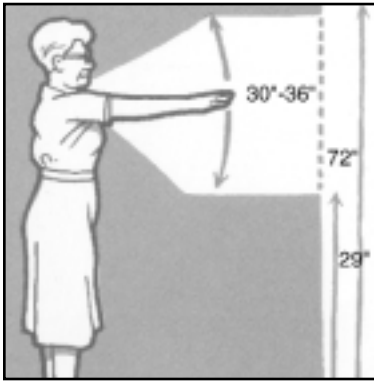
Range of motion refers to the extent of movement possible, including how high people can raise their arms above their shoulders or rotate their arms from the shoulders, how far they can bend their elbows or their knees, and so forth. People with decreased range of motion may have trouble reaching, bending, stooping, kneeling and crouching. These motions are necessary for making beds, cleaning tubs and toilets, reaching objects on shelves, dressing, etc. A person’s height can affect range of motion. A short person may not be able to reach high shelves without a step stool (and using one may be difficult). A tall person may have trouble reaching into floor-level cabinets and lower shelves.



A person in a chair or wheelchair is limited to a maximum side reach of 54 inches and a maximum frontal reach of 48 inches. The lowest easy reach from a seated position

is approximately 9 inches to the side and 12 inches to the front. A standing person has a very different range of reach. When you undertake any home changes, remember these differences.

## Modifications for Strength and Range of Motion



Some modifications enhance existing strength or provide support. Examples are a stool to sit on in the kitchen or bathroom (at a cut-out space under a counter

or a sink) or a harness to hold a person in a standing position at a sink or a counter. Another example is grab bars in the bathroom.

Other modifications reduce the amount of strength needed. It is easy to adjust the tension needed to open and close storm and screen doors and some kinds of cabinet doors. Remote controls can be used with lamps, appliances, televisions and videocassette recorders. Placing equipment and utensils on rolling storage carts that fit under counters brings them to a convenient height. Installing C- or D-shaped loop handles on drawers and cabinets, and easy-gliding hardware on drawers, can be helpful. A spray attachment at the sink can be fitted with an extra-long hose so that pans can be filled after they are placed on the stove. A trash compactor and a garbage disposal will reduce the volume of trash that must be carried to trash bins. There are pneumatic lifts to help people get from a sitting to a standing position.

Compensating for limited range of motion involves bringing controls closer so people don't have to reach for them. Switches, thermostats and electrical outlets can be moved to a zone more comfortable for all people. This is usually defined as an area between 27 and 48 inches above the floor, with a maximum depth of 20 inches.

Other useful products are stoves and ranges with controls mounted on the front or the side; side-by-side, frost-free refrigerator-freezers; front-loading washers and dryers; offset bathtub controls; Lazy-Susans in corner cabinets and refrigerators; and rolling carts for under-the-counter storage. Pull-out shelves with cut-outs to hold bowls are easier to get to than a cabinet.

To make work and storage space more accessible, construct separate work surfaces at different heights for persons in the same household who are of different ages, heights and ability levels. Adjustable shelves in kitchen cabinets, pantries and closets can be moved as children grow and adults age. There are many other products for making cabinets and closets more efficient.

Sinks and counter-tops in kitchens and bathrooms also can be made adjustable. For sinks, this requires a flexible water-supply line leading to the faucet and an extra tail-piece, with a slip joint, on the drainpipe.

## Cognitive Difficulties

When a person is disoriented even familiar environments may seem hostile. Mental processing, or cognition, involves recognizing the elements of a situation, perceiving their functions, and understanding the process of which they are a part. People whose cognition is diminished may not react quickly to stimuli such as a hot burner or a sharp knife, and may not be able to distinguish or sort competing signals. They may also have trouble remembering or understanding information and may process it slowly. They may be disoriented as to time and space.

People with diminished cognition may not comprehend danger from radiators, sharp knives, open windows, or steep staircases. They may wander away and then not be able to remember their way home, or to recall their phone numbers and addresses.

## Modifications for Cognitive Difficulties

For a person with this condition, the home must be made as safe as possible and yet retain visual familiarity.

Create barriers to keep the person from wandering away from home or straying into dangerous areas such as stairways or rooms where there are hazards. Kinds of barriers include fences or hedges around the yard, screens on doors and windows, automatic door-closing devices, gates, locked doors, alarms on doors to the outside, double-key locks, or locks placed beyond the person's reach (high or low). Reverse locks on the bedroom door, bed rails, room-darkening shades or a monitor can help ensure that the person does not wander around at night.

The person with cognitive difficulties should not have access to dangerous items such as knives, hot burners, electrical equipment and outlets, and household chemicals and medicines. Family members might put child-proof plugs in electrical outlets; place guards over radiators; put covers on stove or range burners; and install locks on refrigerators, freezers, medicine cabinets, and closets that contain cleaning supplies.

Make sure the layout of furniture and pathways through the home are familiar and safe. Use furnishings that are stable and don't have sharp corners. Remove scatter rugs, sharp objects and clutter.

Sometimes it is possible to enhance cognition. An example is burners on an electric range that grow brighter as the temperature increases. Placing pictures of familiar activities and individuals on the entrances to various rooms can help a person remember.

## Mobility Impairments

Standing or walking from one place to another and going up and down steps can be extremely difficult for people with limited

mobility. Long, crooked, inclined or uneven pathways are especially hazardous. Some people are not able to walk at all and must perform all daily activities from a wheelchair.

People who use wheelchairs and walkers may not be able to negotiate thresholds or narrow doorways and corridors. People with limited mobility may have difficulty getting in and out of bed, on and off the toilet, and in and out of the tub or the shower. They may be at risk of a scalding at the sink or in the shower when the flush of a toilet draws off cold water, not because they cannot feel the hot water but because they cannot move quickly or without assistance.

## Modifications for Mobility Impairments

To help people with limited mobility live independently, barriers outside and inside



the home must be removed. An automatic garage-door opener, a ramp or a berm (an earthen substitute for a ramp) leading to the entrance to the home, and curb cuts in sidewalks can help outside. Inside, widen and reframe doorways so that there is at least 36 inches of clearance for a wheelchair or

walker. If just an additional inch or two of space will make a doorway wide enough, replace standard hinges with swing-clear hinges. When the swing of a door takes up the maneuvering space that a wheelchair user needs, install a pocket door that slides

back into a wall pocket. Replace any high thresholds with low, beveled ones or with smooth flooring. Install ramps wherever the floor level changes in the home.

Lever handles on doors are easier for everyone to manipulate. Add-on levers and replacement levers are both available. A C- or D-shaped loop handle mounted on the pull side of a door, near the hinged edge, helps users of wheelchairs or walkers close doors behind them.

Make sure there is ample maneuvering space within the home by moving any furniture that obstructs walkways. High-density, low-pile carpeting makes it easier to move wheelchairs and use walkers without tripping.

If possible, there should be a bathroom and bedroom on the ground floor for the person who has mobility problems. This might involve converting a den or a study to a bedroom, and a half bath to an accessible full bath; or, rooms can be added to the house. If these kinds of modifications are not possible, a chairlift or an elevator can be installed to transport the person from one level to another. If the individual can still climb the stairs, organize activities and storage areas so that he or she needs to climb the stairs as little as possible.

To eliminate barriers in a bathroom, install a roll-in or walk-in shower with a seat and a hand-held shower head with a flexible hose. To move a person in and out of a bathtub, install a water-operated hydraulic seat; a portable, hydraulic boom lift; or an overhead track lift. A lift is also useful in the bedroom. In fact, a professional can craft a track for the lift that will move a person from the bedroom to the bathroom and back.

There should be soft, nonskid surfaces on bathtub bottoms, shower floors, stair treads, and stair landings to minimize the danger of falling. Stair treads of a consistent depth, with closed risers of a consistent height, also

lessen the hazard of going up and down stairs.

Install grab bars or handrails throughout the home to give support and a place to rest. Grab bars are particularly helpful in bathrooms as aids to getting in and out of the shower or tub, and up from or down onto the toilet. Handrails along hallways and on both sides of stairways give security to a person whose mobility is limited.

As with people whose strength and range of motion are limited, it is helpful to bring items to people or to relocate appliances and products. Use pop-up appliance holders, pull-out cutting boards and bowl holders, and cut-out or recessed spaces beneath countertops, cooktops and sinks to accommodate a seated person or a person in a wheelchair. Spacer rings and thick seats can raise the height of existing toilets. There are now new toilets with seats 19 inches above the floor. Store frequently used household items where they can be retrieved with a minimum of bending, reaching, lifting and carrying.

## Balance and Coordination

Loss of balance and coordination makes people unstable when standing or walking and puts them at risk of falling, especially on carpeting, stairs and thresholds. People whose sense of balance or coordination is diminished often shuffle to try to keep from falling, but this actually increases the risk. They may have difficulty raising or lowering themselves from chairs, beds and toilets. Dizziness also can cause these problems.

### Modifications for Balance and Coordination

To make the home safer, lower or remove thresholds, put skid-proof rug pads under area rugs, secure the corners and edges of area rugs, and remove scatter rugs. Place an extended handrail at the head of the stairs to lessen the chance of an unsteady person

falling. Make beds, chairs and toilet seats high enough for easy access. The optimum height differs for each person, but generally it is the height at which the hips and the knees are on the same plane (or the knees are slightly lower) and the feet are approximately under the knees.

People will also need supports to stabilize them as they sit down, rise up and move about. Again, grab bars and handrails are among the most useful items. Placing stable objects near chairs, toilets and beds is especially important. Strategically placed handles on counter tops are also useful. Make sure floors and stairways are well lit.

## Conclusion

Home modifications, whether simple or complex, can allow individuals to remain in the home or families to remain together. Modifications and assistive devices make life easier and safer for everyone.

## Resources:

<http://www.aarp.org/pprograms/homemodification.htm>

<http://www.homemods.org/>

<http://www.usc.edu/dept/gero/hmap/houshi.htm>

<http://www.design.ncsu.edu/cud/index.html>

This fact sheet was adapted from the following references:

"The DoAble Renewable Home: Making Your Home Fit Your Needs" (D12470)

AARP Fulfillment, Consumer Affairs

601 E Street, NW, Washington, D.C. 20049

For more information, call (202) 972-4700; Single copies are free.

"Home Modifications and Products for Safety and Ease of Use," by Margo Johnson, Richard Duncan, Andrea Gabriel and Michael Carter. 1999.

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